MODULE OF BT534349

BT534349

Specification

File status： 　[　]Draft 　[√]Published 　[　]Pending	File name：	Product specification
	Version：	*V1.4*
	Editor：	**Henry Ho**
	Finished date：	2024-07-26

| Version	Editor	Participator	Valid from	Remark
V1.4	**Henry Ho**		2024-07-26	

0 Amendment

1 General Description

The SV6158 WLAN SoC is designed to support IEEE 802.11 b/g/n single spatial stream and Bluetooth 5.0 It is designed with the state of-the-art techniques and process technology to achieve low power consumption and high throughput performance to address the requirement of mobile and handheld devices. The SV6158 WLAN low power function uses the innovative design techniques and the optimized architecture which best utilizes the advanced process technology to reduce active and idle power, and to achieve extreme low power consumption at sleep state to extend the battery life. The SV6158 WLAN A-MPDU Tx function maximizes the throughput performance while achieving the best buffer utilization. The Bluetooth subsystem contains the Bluetooth radio, modem, and link controller.

2 Feature

- IEEE 802.11 b/g/n 1T1R compliant
- IEEE 802.11 d/e/i/k/r/w supported
- Support 20/40MHz up to MCS7 150Mbps
- 802.11n features supported
  – A-MPDU Tx & Rx for high MAC throughput
  – Support immediate Block-Ack
- STA, SoftAP and Sniffer modes supported
- Concurrent AP + STA supported
- Ad-hoc, peer-to-peer and Wi-Fi Direct modes supported
- Low power Tx/Rx for short range scenario
- Low power beacon listen mode
- Low power dormant mode
- WFA features
  – WEP/WPA/WPA2/WPA3
  – WMM
- Short Guard Interval for 802.11n optimal performance
- Greenfield mode for 802.11n optimal performance
- STBC in RX mode
- Tx power: +20 dBm
- Rx sensitivity: -97.5 dBm
- Integrated Balun, T/R switch, LNA and PA for 2.4GHz
- Enhanced and robust sensitivity for wider coverage range
- Supports calibration algorithm to handle non-ideal effects from CMOS RF block

Functional Block Diagram

SV6158 System Block Diagram
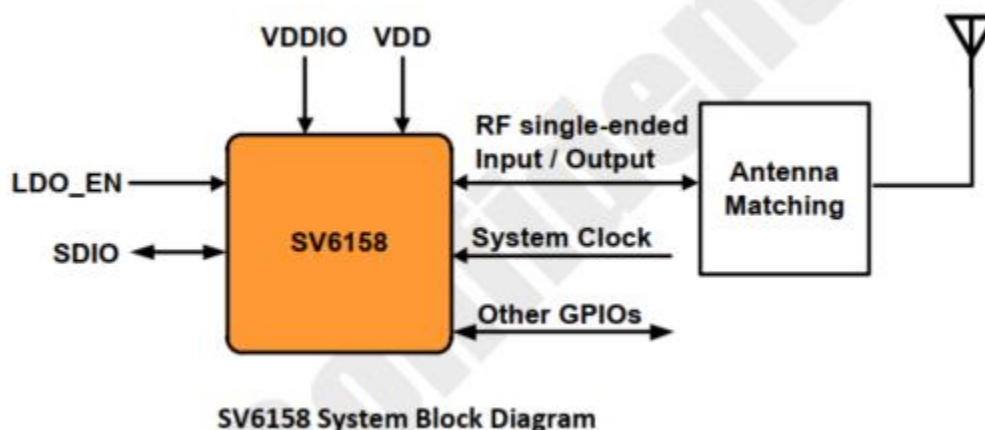
3 Specification

3.1 Absolute Maximum Ratings

The absolute maximum ratings in Table 3 indicate levels where permanent damage to the device can occur, even if these limits are exceeded for only a brief duration. Functional operation is not guaranteed under these conditions. Operation at absolute maximum conditions for extended periods can adversely affect long-term reliability of the device.

Symbol (domain)	Description	Max Rating	Unit
AVDD11_SX	VDD input for analog 1.1V	-0.3 to 1.8	V
AVDD11_RF	VDD input for analog 1.1V	-0.3 to 1.8	V
AVDD33_SX	VDD input for external components I/O control	-0.3 to 3.6	V
AVDD33_PA	VDD input for external components I/O control	-0.3 to 3.6	V
AVDD33_TX	VDD input for external components I/O control	-0.3 to 3.6	V
DVDDIO1	VDD input for GPIO pins	-0.3 to 3.6	V
DVDDIO2	VDD input for GPIO pins	-0.3 to 3.6	V
DVDDIO3	VDD input for GPIO pins	-0.3 to 3.6	V
DVDD08_DIG	VDD output for internal digital circuit	-0.3 to 1.0	V
DVDD11_DIG	VDD input for digital circuit's LDO	-0.3 to 1.4	V
VBAT	VDD input for VBAT	-0.3 to 5.5	V
AVDD33_DCDC	VDD input for DCDC	-0.3 to 3.6	V

3.2 Recommended Operating Conditions And Dc Characteristics

Domain (Symbol)	Description	Min.	Typ.	Max.	Unit
AVDD11_SX	VDD input for analog 1.1V	0.9	1.1	1.3	V
AVDD11_RF	VDD input for analog 1.1V	0.9	1.1	1.3	V
AVDD33_SX	VDD input for external components I/O control	2.1	3.3	3.46	V
AVDD33_PA	VDD input for external components I/O control	2.1	3.3	3.46	V
AVDD33_TX	VDD input for external components I/O control	2.1	3.3	3.46	V
DVDDIO1	VDD input for GPIO pins	1.75	3.3	3.46	V
DVDDIO2	VDD input for GPIO pins	1.75	3.3	3.46	V
DVDDIO3	VDD input for GPIO pins	1.75	3.3	3.46	V
DVDD08_DIG	VDD output for internal digital circuit		0.8		V
DVDD11_DIG	VDD input for digital circuit's LDO		1.1		V
VBAT with 5v[a]	VDD input	3.3	5	5.25	V
RVDD33[a]	VDD output		3.3		V
VBAT with 0v[b]	VDD input/VDD output		0		V
AVDD33_DCDC	VDD input for DCDC	2.1	3.3	3.46	V
(V_{IL})	Input Low voltage when VDDIO=3.3V	-0.3		0.8	V
(V_{IH})	Input High voltage when VDDIO=3.3V	2		3.6	V
(V_{T+})	Schmitt trigger low to high threshold voltage when VDDIO=3.3V	1.52	1.63	1.77	V
(V_{T-})	Schmitt trigger high to low threshold voltage when VDDIO=3.3V	1.29	1.41	1.56	V
(V_{OL})	Output low voltage when VDDIO=3.3V			0.4	V
(V_{OH})	Output high voltage when VDDIO=3.3V	2.4			V
(R_{PD})	Input weakly pull-down resistance when VDDIO=3.3V. All GPIO pins have internal weakly pull-down option except that GPIO_5 has internal weakly pull-up option				KΩ
(R_{PU})	Input weakly pull-high resistance when VDDIO=3.3V. All GPIO pins have internal weakly pull-down option except that GPIO_5 has internal weakly pull-up option				KΩ
VIH_Nrst	Chip reset release voltage		>1		V
VIL_Nrst	Chip reset voltage		<0.1		V

(I$_{OL}$)	Low level output current @ V$_{OL}$(max), 8 mA setting	5.2	7.52	10.09	mA
	Low level output current @ V$_{OL}$(max), 12 mA setting	10.4	15.03	20.2	mA
(I$_{OH}$)	High level output current @ V$_{OH}$(min), 8 mA setting	6.8	12.08	18.44	mA
	High level output current @ V$_{OH}$(min), 12 mA setting	12.7	22.64	35.09	mA

*a: In 5v application, VBAT connects to 5V, RVDD33 can provide 3.3V.

*b: In 3.3v application, VBAT connects to 0v, RVDD33 is connected to 0v as well.

3.2 Frequency Reference
CRYSTAL OSCILLATOR SPECIFICATIONS

Table 9: Crystal Oscillator Specifications

Parameter	Condition/Notes	Min.	Typ.	Max.	Unit
Frequency	–		24/26/40 MHz		
Crystal load Capacitance	–	–	10		Pf
ESR	–	–	–	70	Ω
Frequency tolerance Initial and over temperature	–	-20	–	20	ppm

EXTERNAL CLOCK-REQUIREMENTS AND PERFORMANCE

Table 10: External Clock-Requirements and Performance

Parameter	Condition/Notes	Min.	Typ.	Max.	Unit
Frequency	–		24/26/40 MHz		
OSCIN Input Voltage	AC-couple analog signal	400	–	900	mV$_{PP}$
Frequency tolerance Initial and over temperature	–	-20	–	20	ppm
Duty Cycle	26MHz clock	40	50	60	%
Phase Noise (802.11b/g)	26MHz clock at 1KHz offset	–	–	−119	dBc/Hz
	26MHz clock at 10KHz offset	–	–	−129	dBc/Hz
	26MHz clock at 100KHz offset	–	–	−134	dBc/Hz
	26MHz clock at 1MHz offset	–	–	−139	dBc/Hz
Phase Noise (802.11n 2.4GHz)	26MHz clock at 1KHz offset	–	–	−125	dBc/Hz
	26MHz clock at 10KHz offset	–	–	−135	dBc/Hz
	26MHz clock at 100KHz offset	–	–	−140	dBc/Hz
	26MHz clock at 1MHz offset	–	–	−145	dBc/Hz

4 Drawing

4.1 Mechanical Specifications

4 x 4 mm (body size), 0.4mm pitch QFN-32

TOP VIEW
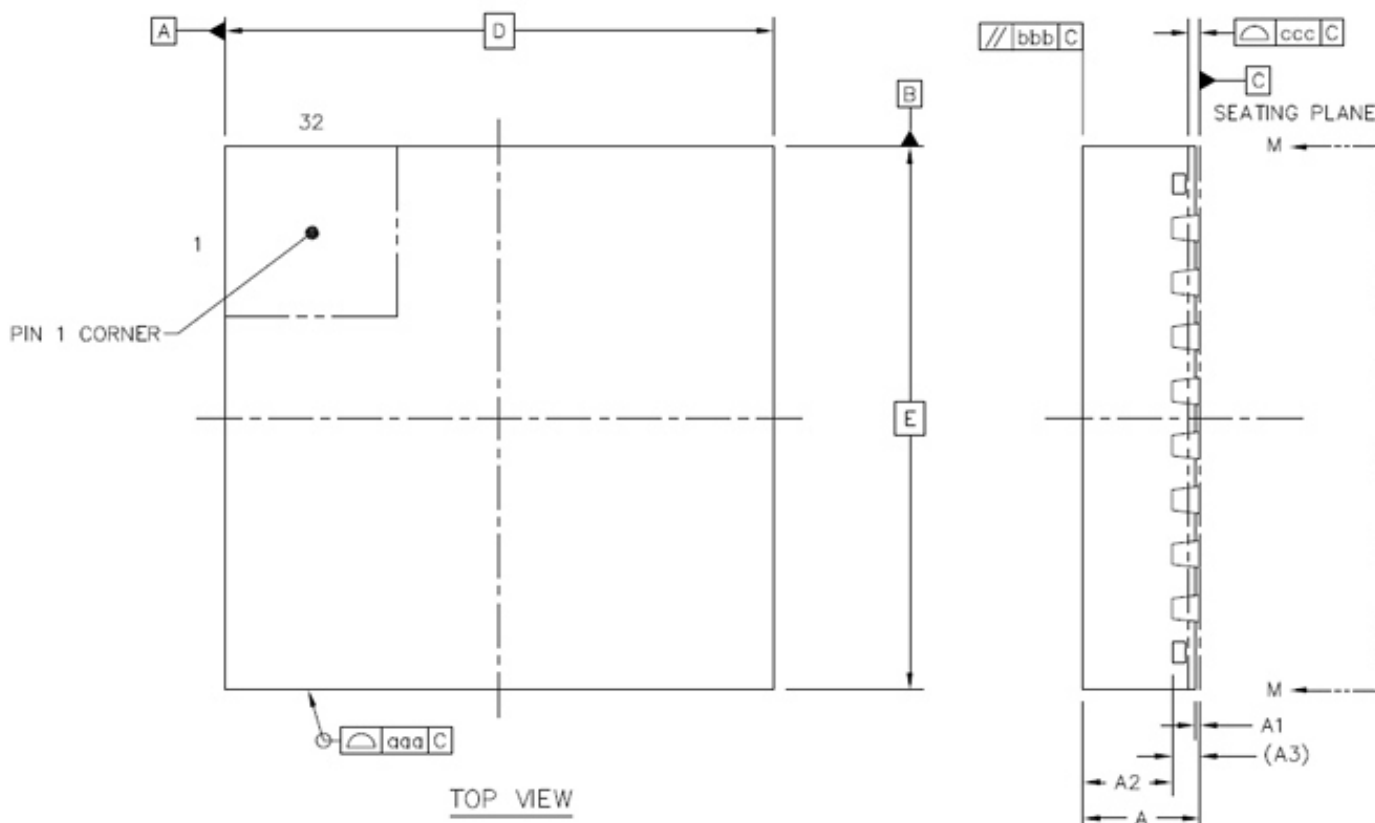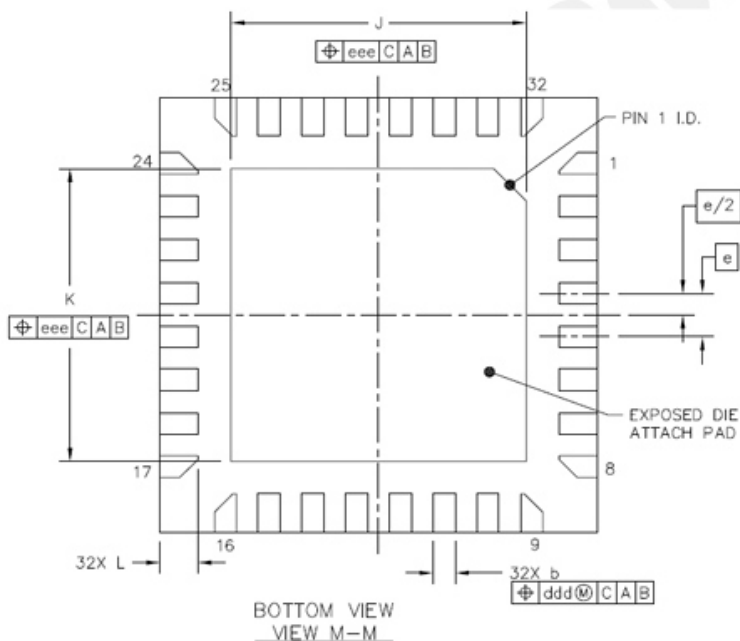
		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.8	0.85	0.9
STAND OFF		A1	0	0.035	0.05
MOLD THICKNESS		A2	---	0.65	---
L/F THICKNESS		A3		0.203 REF	
LEAD WIDTH		b	0.15	0.2	0.25
BODY SIZE	X	D		4 BSC	
	Y	E		4 BSC	
LEAD PITCH		e		0.4 BSC	
EP SIZE	X	J	2.6	2.7	2.8
	Y	K	2.6	2.7	2.8
LEAD LENGTH		L	0.3	0.35	0.4
PACKAGE EDGE TOLERANCE		aaa		0.1	
MOLD FLATNESS		bbb		0.1	
COPLANARITY		ccc		0.08	
LEAD OFFSET		ddd		0.1	
EXPOSED PAD OFFSET		eee		0.1	

5 Remark

5.1 Storage Temperature and Humidity

The calculated shelf life in sealed bag is 12 months if stored between 0°C and 40°C at less than 90% relative humidity (RH). After the bag is opened, devices that are subjected to solder reflow or other high temperature processes must be handled in the following manner:

a) Mounted within 168-hours of factory conditions < 30 °C /60%RH

b) Storage humidity needs to maintained at <10% RH

c) Baking is necessary if customer exposes the component to air over 168 hours, baking condition: 125°C / 8hours

FCC Information

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or change to this equipment. Such modifications or change could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which
the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Information:
The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

This module is for internal use only and not sold outside.

Antenna Information
It is 2.4GHz 3216 chip antenna, model 3216X02.

Additional testing, Part 15 Subpart B disclaimer: The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuity.

The modular must be installed in the host that assign by
Company name: Winplus Co., Ltd.
Product/PMN: Minicam
Model no./HVIN: BT534349
The Class II permissive changes is required for each specific host installation

Class II Permissive Change (C2PC) Test Plan for Host Devices

Test plan for Class ll Permisive Changes (C2PC) on FCC ID: WUI-BEON:

1) Output power. (FCC Part 15.247(b))
2) Output Power Spectral Density. (FCC Part 15.247(e))
3) AC Conducted Emission. (FCC Part 15.207)
4) Radiated Emission (FCC Part 15.205/209, FCC Part 15.247(d))
5) Host cannot change the RF Exposure use conditions. lf use conditions is changed the separate approval shall be required.

Note：
1. These tests be based on C63.10 and FCC Part 15.247 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (IEEE 802.11b, IEEE 802.11g, IEEE 802.11n HT20, IEEE 802.11n HT40) need to be tested.

IC Information
-English:
This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s).
Operation is subject to the following two conditions:
- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

-French:
Cet appareil contient un ou des émetteurs/récepteurs exempts de licence conformes aux RSS exempts de licence d'Innovation, Sciences et Développement économique Canada.
Le fonctionnement est soumis aux deux conditions suivantes :
- Cet appareil ne doit pas provoquer d'interférences.
- Cet appareil doit accepter toutes les interférences, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

BT534349
Minicam
Responsible Party:
Horizon Brands
2975 Red Hill Ave., Ste. 100,
Costa Mesa, CA 92626, U.S.A.
Tel: 1.866.294.9244